

**POSSIBLE ROLE OF SOAP STRENGTH ON MECHANICAL  
STABILITY AND OTHER PROPERTIES OF LOW QUALITY  
LA-T2 NATURAL RUBBER LATEX CONCENTRATE**

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## DECLARATION

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## ABSTRACT

Ever-growing impact of rubber and its products form an inseparable and integral part in human life. But today, rubber industries suffer from lack of quality latex for production. Over the last few decades, various efforts have been carried out to study the ability of Fatty Acid soaps to enhance stability of latex upon mechanical forces. However, an investigation has never been carried out in Sri Lanka on property variation of low quality latex upon soap addition. This study was undertaken with the view to fulfill this requirement. Current study consists of determination of MST and other properties of low quality latex and brief investigation on anti foaming behaviour of phenol on latex base.

Latex was obtained with absence of added soap on a special request from centrifuge plant of Lalan group. They were collected from small holders of Matale, which represents the non-specific climatic conditions for latex production. Soap was added in different strengths at different maturity times. Following properties were investigated at intervals: MST, KOH number, Viscosity, Foaming Height, and Conductivity. Anti-foaming behaviour of phenol on latex base was determined.

Results of this study provide information of low quality latex upon soap addition and aging. Out of entire investigated properties response to the soap was remarkable in MST and Foaming Height upon aging. Viscosity showed great variation within 3 weeks maturation. Prevalence of soap was critical between soap levels of  $4.2 \times 10^{-4}$  and  $5.0 \times 10^{-4}$  moles per 100g of latex. Results suggest that the system attain to critical micelle concentration within this range.

Minimum soap level that is necessary to create observable change in MST and Foaming Height lies between  $0.5 \times 10^{-4}$  and  $0.84 \times 10^{-4}$  moles per 100g latex. Soap level of  $0.5 \times 10^{-4}$  makes great variations in Viscosity, Conductivity and KOH No. Effect of soap on Conductivity and KOH No diminishes after  $8.41 \times 10^{-4}$  moles of soap. Both

properties are responsible for the total molecules that are present in the ionized form and not the total molecules in the medium. Since, the soap effect upon KOH No diminishes after certain soap level it cannot be used as an identification of soap addition to latex. However added soap can be identified by variation in the Foaming Height. Significant relationship between soap addition and foaming height reveals that the foreign soap molecules increase the froth formation in latex.

Phenol addition can reduce the foaming in latex. But it reduces the MST of the latex and hence detrimental for the quality of latex.

Variation in MST and Viscosity by deliberate soap addition primarily causes by Fatty Acid soap ions that are adsorbed at the particle surfaces. Variations in KOH No, Conductivity and Foaming Height has brought about by consequent changes taking place in the medium.



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# TABLE OF CONTENTS

	Page No.
<b>Declaration</b>	I
<b>Abstract</b>	II
<b>Acknowledgement</b>	IV
<b>Table of contents</b>	V
<b>List of Tables</b>	VIII
<b>List of Figures</b>	IX
<b>List of Abbreviations</b>	XI
 <b>CHAPTER 1 - INTRODUCTION</b>	 01
1.1 Background Motivation	02
1.2 Aims and Objectives	04
 University of Moratuwa, Sri Lanka Electronic Theses & Dissertations www.lib.mrt.ac.lk	
<b>CHAPTER 2 - LITERATURE REVIEW</b>	05
2.1 Historical background of Latex Production	06
2.2 Natural Rubber Latex	06
2.2.1 NRL is a living pharmaceutical factory	07
2.2.2 NRL and the greenhouse effect	07
2.2.3 Significance of NRL in other areas	08
2.3 Definition of latex	08
2.3.1 Constituents in NRL	09
2.4 Stability of a colloidal system	10
2.4.1 Destabilization	11
2.4.2 Mechanisms of destabilization	11
2.4.2.1 Chemical destabilization	11
2.4.2.2 Physical destabilization	12
2.5 Characteristic properties of NRL	12
2.5.1 Mechanical Stability of Natural Rubber Latex	13

2.5.2 KOH No of natural rubber latex	14
2.5.3 VFA No of natural rubber latex	14
2.5.4 Conductivity of NR latex	14
2.5.5 Viscosity of NR latex	15
2.6 Preservation	15
2.6.1 Superiority of LATZ system as a preservative	16
2.7 Concentration of NRL	17
2.8 Stabilizing additives	18
2.9 Possible role of Soap on NRL	18
<b>CHAPTER 3 - METHODOLOGY</b>	<b>23</b>
3.1 Determination, organization and preparation of principal requirements	25
3.1.1 Selection of Latex Type	25
3.1.2 Preparation of ammonium laurate soap solution and other chemicals	26
3.1.3 Preparation of latex samples by varying concentration and length of maturation	27
3.2 Study of the role of ammonium laurate soap on the property variation in latex with aging and concentration	29
3.2.1 Determination of MST	31
3.2.2 Determination of KOH No	32
3.2.3 Determination of Viscosity	33
3.2.4 Determination of Foaming Height	34
3.2.5 Determination of Conductivity	34
<b>CHAPTER 4 - RESULTS AND DISCUSSION</b>	<b>35</b>
4.1 Role of fatty acid soap on the properties upon aging	36
4.1.1 Response to the MST	36
4.1.2 Response to the KOH No	39
4.1.3 Response to the Viscosity	42
4.1.4 Response to the Foaming height	44
4.1.5 Response to the Conductivity	47
4.2 Prevalence of properties over strength of soap	49

4.2.1	Prevalence of MST	49
4.2.2	Prevalence of KOH No	51
4.2.3	Prevalence of Viscosity	53
4.2.4	Prevalence of Foaming Height	55
4.2.5	Prevalence of Conductivity	57
4.3	Variation in MST with soap addition over varying length of maturation time	58
4.3.1	Soap addition after one week maturation	58
4.3.2	Soap addition after Two weeks maturation	59
4.3.3	Soap addition after Four weeks maturation	60
4.4	Behaviour of phenol on latex base	62
4.4.1	Influence upon MST	62
4.4.2	Influence upon Conductivity	63
4.4.3	Influence upon Foaming Height	65
4.5	Effect of phenol in highly concentrated soap added latex on MST	66
<b>CHAPTER 5 – CONCLUSION</b>		67
5.1	Conclusion	68
5.2	Future recommendations	68
<b>APENDICES</b>		70
Appendix A Working Plan		71
Appendix B Role of fatty acid soap on the properties upon aging		72
Appendix C Prevalence of properties over strength of soap		75
Appendix D Variation in MST with soap addition over varying length of maturation time		78
Appendix E Behaviour of phenol on latex base		79
<b>REFERENCES</b>		81-85



## LIST OF TABLES

	Page No.
Table 1- Typical composition of field latex	10
Table 2- Properties of the latex	25
Table 3- Samples prepared to investigate property variation with storage time.	28
Table 4- Samples prepared to investigate properties with varying soap concentrations.	29
Table 5- Samples investigated for MST, KOH No, Viscosity, Foaming Height and Conductivity upon maturation.	29
Table 6- Samples investigated for effect of soap concentration upon MST, KOH No, Viscosity, Foaming Height and Conductivity	30
Table 7- Samples investigated for MST with soap addition over varying maturation time	30
Table 8- Samples investigated for effect of phenol addition upon MST, Foaming Height and Conductivity with soap and phenol and soap concentration	31
Table 9- Samples investigated for effect of phenol addition upon MST	31

## LIST OF FIGURES

	Page No.
Figure 1. Effect of fatty acid soap addition on Mechanical Stability Time upon maturation of LA-TZ latex	36
Figure 2. Effect of fatty acid soap addition on KOH number upon maturation of LA-TZ latex	40
Figure 3. Effect of fatty acid soap addition on Viscosity upon maturation of LA-TZ latex	43
Figure 4a. Effect of fatty acid soap addition on Foaming Height upon maturation of to LA-TZ latex (Measurements taken at 25 seconds)	45
Figure 4b. Effect of fatty acid soap addition on Foaming Height upon maturation of LA-TZ latex (Measurements taken at 60 seconds)	45
Figure 5. Effect of fatty acid soap addition on Conductivity upon maturation of LA-TZ latex	47
Figure 6. Effect of level of fatty acid soap addition after two weeks of collection upon mechanical stability of LA-TZ latex	49
Figure 7. Effect of level of fatty acid soap addition after two weeks of collection upon KOH Number of LA-TZ latex	52
Figure 8. Effect of level of fatty acid soap addition after two weeks of collection upon Viscosity of LA-TZ latex	54
Figure 9. Effect of level of fatty acid soap addition after two weeks of collection upon Foaming Height of LA-TZ latex	56
Figure 10. Effect of level of fatty acid soap addition after two weeks of collection upon Conductivity of LA-TZ latex	57
Figure 11. Fatty acid soap addition to one week matured LA-TZ latex and its effect on mechanical stability	59
Figure 12. Fatty acid soap addition to four weeks matured LA-TZ latex and its effect on mechanical stability	61
Figure 13. Influence of phenol and combination of phenol and soap addition on MST of LA-TZ latex upon maturation	62

Figure 14a. Influence of phenol and combination of phenol and soap addition on Foaming Height of LA-TZ latex upon maturation (Measurements taken at 25 seconds)	64
Figure 14b. Influence of phenol and combination of phenol and soap addition on Foaming Height of LA-TZ latex upon maturation (Measurements taken at 25 seconds)	64
Figure 15. Influence of phenol and combination of phenol and soap addition on Conductivity of LA-TZ latex upon maturation	65



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## LIST OF ABBREVIATIONS

Ca	- Calcium
CO <sub>2</sub>	- Carbon Dioxide
CO <sub>3</sub> <sup>-2</sup>	- Carbonate ion
cp(s)	- Centipoises
DRC	- Dry Rubber Content
FA(s)	- Fatty Acid(s)
F.H	- Foaming Height
HA	- High Ammonia
HCO <sub>3</sub> <sup>-</sup>	- Bicarbonate ion
HFA	- Higher Fatty Acid(s)
Int'l	- International
IRSG	- International Rubber Study Group
LA	- Low Ammonia
LATZ	- Low ammonia latex preserved with ZnO and TMTD
K/K <sup>+</sup>	- Potassium/Potassium ion
KOH No	- Potassium Hydroxide number
Mg/Mg <sup>2+</sup>	- Magnesium/Magnesium ion
MRPRA	- Malaysian Rubber Producers Research Association
MST	- Mechanical Stability Time
MS	- Mechanical Stability
mS	- Milliseiman
No	- Number
Na/Na <sup>+</sup>	- Sodium/Sodium ion
NCRT	- National College of Rubber Technology
NH <sub>4</sub> OH	- Ammonium Hydroxide
NRL	- Natural Rubber Latex
O <sub>2</sub>	- Oxygen
RRIM	- Rubber Research Institute of Malaysia
VFA	- Volatile Fatty Acid
TMTD	- Tetra Methyl Thiuram Disulphide
TSC	- Total Solid Content
ZnO	- Zinc Oxide